Name: Date:

Polynomial Factoring solution (version 21)

1. **The quadratic formula says if $ax^2 + bx + c = 0$ then $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$. Use the quadratic formula to solve the following equation.**

$$x^2 - 8x + 23 = 0$$

Simplify your answer(s) as much as possible.

Solution

$$x = \frac{-(-8) \pm \sqrt{(-8)^2 - 4(1)(23)}}{2(1)}$$

$$x = \frac{-(-8) \pm \sqrt{64 - 92}}{2(1)}$$

$$x = \frac{8 \pm \sqrt{-28}}{2}$$

$$x = \frac{8 \pm \sqrt{-4 \cdot 7}}{2}$$

$$x = \frac{8 \pm 2\sqrt{7}\,i}{2}$$

$$x = 4 \pm \sqrt{7}\,i$$

Notice that i in NOT under the square-root radical symbol!!

2. **Express the product of $4 + 9i$ and $5 + 3i$ in standard form ($a + bi$).**

Solution

$$(4 + 9i) \cdot (5 + 3i)$$

$$20 + 12i + 45i + 27i^2$$

$$20 + 12i + 45i - 27$$

$$20 - 27 + 12i + 45i$$

$$-7 + 57i$$

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3. **Write function $f(x) = x^3 + 4x^2 - 25x - 100$ in factored form. I'll give you a hint: one factor is $(x - 5)$.**

Solution

	1	4	-25	-100
5		5	45	100
	1	9	20	0

$$f(x) = (x-5)(x^2+9x+20)$$

$$f(x) = (x-5)(x+5)(x+4)$$

4. **Polynomial p is defined below in factored form.**

$$p(x) = (x+7)^2 \cdot (x+3)^2 \cdot (x-1) \cdot (x-6)$$

Sketch a graph of polynomial $y = p(x)$.